

US EPA ARCHIVE DOCUMENT

SESSION 3

Corrective Measures Selection Process

OVERVIEW OF THE APPROACH TO SELECTING CORRECTIVE MEASURES



Agenda: Overview of the Approach to Selecting Corrective Measures

- ▶ Development of Corrective Measures Alternatives

- ▶ Evaluation Criteria
 - Performance Standards
 - Balancing/Evaluation Criteria



Corrective Measures Alternatives Must Be Developed to Address All of the Contamination Issues at a Site

- ▶ Tailor the evaluation of alternatives based on site-specific circumstances
- ▶ Evaluate only implementable approaches, consistent with expected future land uses
- ▶ Limit the number of alternatives evaluated to those necessary to demonstrate that the preferred remedy:
 - Is capable of achieving the three final remedy performance standards
 - Is acceptable with respect to the balancing/evaluation criteria

The Corrective Measures Selection Process Should Be Tailored to Fit the Situation

- ▶ Evaluate only the most likely alternatives that can be:
 - Reasonably expected to meet remediation goals
 - Agreed to by the facility and regulators
- ▶ The level of documentation required is only that necessary to adequately document the decision rationale
- ▶ Simple, straightforward contamination scenarios may require:
 - Evaluation of a more limited number of alternatives
 - Less detailed evaluation and documentation
- ▶ More complex contamination scenarios may require:
 - Evaluation of a greater number of alternatives
 - More detailed evaluation and documentation
- ▶ Requirements may be specified in a permit or order



Individual Remediation Technologies are Grouped to Form Corrective Measures Alternatives

- ▶ Identify technologies to address each:
 - Contaminant of concern
 - Medium of concern

- ▶ Screen technologies to identify those that are most likely to be effective

- ▶ Combine technologies into alternatives that address all contamination issues at the site
 - Contaminants of concern
 - Media of concern
 - Risk and exposures

- ▶ Screen alternatives to determine which ones should be evaluated in more detail

All Final Remedies Should Be Capable of Achieving Three Performance Standards

1. Protect human health and environment
2. Achieve media cleanup objectives/standards
3. Control/remediate sources of releases



Protect Human Health and Environment

- ▶ General mandate from the RCRA statute
- ▶ Primary goal of corrective action
- ▶ Evaluated based on reasonably anticipated land use(s):
 - Current
 - Future
- ▶ Can be achieved by:
 - Removing contamination
 - Treating contamination
 - Preventing exposure to contamination
 - A combination of these actions

Remedies that **permanently eliminate contamination** from a site through removal and/or treatment are generally **preferred over those that prevent exposure** through physical or institutional controls.

Achieve Media Cleanup Objectives/Standards

- ▶ Media cleanup objectives/standards should:
 - Be appropriate given the site-specific assumptions regarding current and reasonable anticipated future land use(s) and potential beneficial uses of water resources
 - Address media cleanup levels (contaminant concentrations) that are appropriate for land and water resource uses
 - Consider appropriate receptors and sufficiently conservative exposure parameters
 - Occur at appropriate points of compliance and within reasonable remediation time frames

- ▶ Reduce the **cumulative** excess risk of cancer to an individual exposed over a lifetime to 10^{-4} to 10^{-6}

- ▶ Hazard Index equal to or less than 1.0 is generally considered appropriate for noncarcinogenic contaminants



Control/Remediate Sources of Releases

- ▶ Sources of releases should be remediated so as to **eliminate or reduce further releases** of hazardous wastes or hazardous constituents that may pose unacceptable risks to human health and the environment
- ▶ “Sources” includes both the location of the original release as well as locations where **any significant mass or concentration of contaminants** may have migrated
- ▶ EPA expects more aggressive remedies for higher risk sites
 - Treatment technologies should be used to address the risks associated with principal threat wastes (highly toxic, highly mobile, not reliably contained, high risk to human health)
 - Containment technologies as well as institutional controls can be used to address wastes that pose relatively low long-term threats

The Following Balancing/Evaluation Criteria are used to Determine the Most Favorable Alternative When Several Satisfy the Performance Standards

1. Long-term reliability and effectiveness
2. Reduction in the toxicity, mobility, or volume of wastes
3. Short-term effectiveness
4. Implementability
5. Cost
6. Community acceptance
7. State acceptance

Long-term Reliability and Effectiveness

- ▶ Evaluate degree of certainty that an alternative will remain protective of human health and environment

- ▶ Should consider:
 - Magnitude of risk that will remain
 - Reliability of any containment systems or institutional controls

Reduction in the Toxicity, Mobility, or Volume of Wastes

- ▶ Evaluate degree to which treatment reduces toxicity, mobility, and volume of hazardous waste

- ▶ Should consider:
 - Amount treated
 - Degree to which treatment is irreversible
 - Potential toxicity, mobility, and volume of treatment residues

Short-term Effectiveness

- ▶ Evaluate implementation timeframes and short-term risks posed by remedy
- ▶ Should consider:
 - The potential short term increases in exposure caused by the remedy
 - Exposure to contaminated subsurface soil and airborne dust during excavation
 - Mobilization of groundwater contamination caused by increased gradients or injected materials
 - Amount of time required for design, construction, and implementation

Implementability

- ▶ Evaluate ease or difficulty of implementation
- ▶ Should consider:
 - Technical feasibility of constructing, operating, and monitoring remedy
 - Administrative feasibility
 - Availability of services and materials required (e.g., disposal services, construction materials)

Cost

- ▶ Evaluate cost of implementing remedy as designed
- ▶ Should consider:
 - Capital costs
 - Operation and maintenance costs
 - Based on realistic timeframe estimates
 - Not based on an arbitrary 30-year period
 - Net present value of costs
 - Provides an equal basis for comparison of alternatives with different durations
 - Assumes current year money will be invested for payment of future year costs

Community Acceptance

- ▶ Evaluate degree to which a remedy will be acceptable to interested community
- ▶ Should consider:
 - Public participation and community involvement
 - Public comments

State Acceptance

- ▶ Evaluate degree to which the remedy is acceptable to regulating state
 - Particularly important when EPA selects the remedy rather than the state

Resources

- ▶ RCRA Corrective Action Workshop on Results-Based Project Management: Fact Sheet Series, March 2000
 - Fact Sheet #2: Expectations for Final Remedies at RCRA Corrective Action Facilities
 - Fact Sheet #3: Final Remedy Selection for Results-Based RCRA Corrective Action
- ▶ RCRA Corrective Action Plan, OSWER Directive 9902.3-2A, Final, May 1994
- ▶ Rules of Thumb in Superfund Remedy Selection, EPA/540/R-97/D13, August 1997

<http://www.epa.gov/epaoswer/hazwaste/ca/guidance.htm>